CLAIMS

We claim:

1. A variable waveguide system, comprising:

a waveguide;

a dielectric structure defining at least one cavity disposed within said waveguide; and

a conductive fluid, wherein said waveguide has a first operational state in which said cavity is filled with said conductive fluid and a second operational state in which said cavity is purged of said conductive fluid.

2. The variable waveguide system according to claim 1 wherein said waveguide has a first cutoff frequency in said first operational state and a second cutoff frequency different from said first cutoff frequency in said second operational state.

3. The variable waveguide system according to claim 1 wherein said waveguide has a first electrical length in said first operational state and a second electrical length different from said first electrical length in said second operational state.

4. The variable waveguide system according to claim 1 wherein said dielectric structure is comprised of a plurality of fluid conduits, each defining an elongated cavity, and arranged in a row to form an effective waveguide wall.

5. The variable waveguide system according to claim 4 wherein said plurality of fluid conduits extend from a first wall of said waveguide to an second wall of said waveguide, said second wall being spaced from said first wall.

6. The variable waveguide system according to claim 5 wherein said conductive fluid contained in said plurality of fluid conduits in said first state forms an electrical connection with said first and second walls.

7. The variable waveguide system according to claim 1 wherein said dielectric structure is comprised of at least a first solid dielectric wall extending from a first conductive wall of said waveguide to a second conductive wall of said waveguide, said second conductive wall being spaced from said first conductive wall.

8. The variable waveguide system according to claim 7 wherein said cavity is defined between said first dielectric wall and at least one conductive wall of said waveguide.

9. The variable waveguide system according to claim 7 wherein said dielectric structure is further comprised of a second dielectric wall, and said cavity is defined between said first and second dielectric walls.

10. A variable waveguide system according to claim 1 further comprising a fluid control system for transferring said conductive fluid into and out of said at least one cavity responsive to a control signal.

11. A method for controlling a waveguide, comprising the steps of:

providing a waveguide dimensioned for producing a first electrical characteristic for said waveguide; and

responsive to a control signal, adding a conductive fluid to an internal portion of said waveguide to produce a second electrical characteristic for said waveguide, said second electrical characteristic being different from said first electrical characteristic.

12. The method according to claim 11 further comprising the step of constraining said conductive fluid in a portion of said waveguide to modify a cutoff frequency of said waveguide.

13. The method according to claim 11 further comprising the step of constraining said conductive fluid in a portion of said waveguide to modify an electrical length of said waveguide.

14. The method according to claim 11 further comprising the step of constraining said conductive fluid in a plurality of fluid conduits, each defining an elongated cavity, and arranged in a row to form an effective waveguide wall.

15. The method according to claim 14 further comprising the step of forming an electrical connection between said conductive fluid and at least one conductive wall of said waveguide.

16. The method according to claim 11 further comprising the step of constraining said conductive fluid using at least a first solid dielectric wall

extending from a first conductive wall of said waveguide to a second conductive wall of said waveguide, said second conductive wall being spaced from said first conductive wall.

17. The method according to claim 16 further comprising the step of constraining said conductive fluid between said first dielectric wall and at least one conductive wall of said waveguide.

18. The method according to claim 17 further comprising the step of constraining said conductive fluid between said first dielectric wall and a second dielectric wall.